AP Biology, Semester 1
Unit Quiz: Biological Diversity
Instructor Version

Section I: Multiple-Choice Questions

Answer Sheet

1.	E
2.	C
3.	E
4.	E
5.	A
6.	B
7.	E
8.	A
9.	A
10.	E

11.	A
12.	E
13.	C
14.	A
15.	B
16.	B
17.	D
18.	A
19.	C
20.	B

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Section II: Free-Response Questions

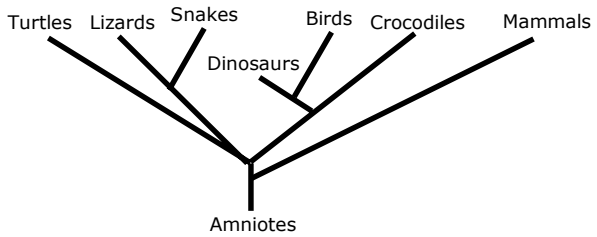
Time Limit: You have 30 minutes to complete this section. Both questions are weighted equally, so allow around 15 minutes for each question. You may move back and forth between questions until time is called.

Scoring: 20 points each, 40 points total

Directions: Answer each of the questions in essay form. Outline form is not acceptable. Labeled diagrams may be used to supplement your answer, but a diagram alone is insufficient. Read each question carefully before you begin to write your answer.

1. **Birds have traditionally been excluded from the group of organisms traditionally classified as reptiles, including crocodiles, turtles, lizards, and snakes. Explain why this classification scheme is inconsistent with the preferred approach of modern systematics, which seeks to create taxonomic groups from single clades. You may use a cladogram to support your answer.**

   ANSWER:
   Birds descended from a group of prehistoric reptiles, dinosaurs, during the Mesozoic era. The place of birds in relation to reptiles is illustrated by this cladogram:



   Since birds share a common ancestor with dinosaurs and all living reptiles, they must be included with reptiles in order for a complete clade to be formed. In other words, reptiles, as traditionally defined, do not form a clade, since the most recent ancestor of reptiles gave rise to birds as well. To satisfy the approach of modern systematists, reptiles might be expanded to include birds as a highly specialized subgroup.

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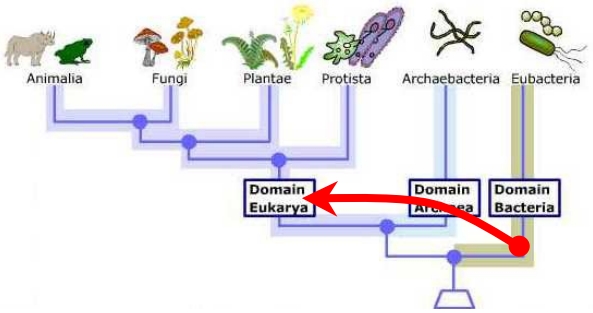
2. **Explain how endosymbiosis led to the formation of eukaryotic organelles. Why is a standard cladogram inadequate to illustrate the ancestry of a species that arises from endosymbiosis?**

ANSWER:
Endosymbiosis is an association between two organisms in which one lives permanently inside the body of the other. Biologists believe that primitive eukaryotic cells, which lacked organelles, engulfed ancient symbiotic eubacteria, but did not digest them. Some of the ingested eubacteria became mitochondria; the original eubacteria, and the cell that resulted from the endosymbiosis, were able to use oxygen to break down organic compounds for energy. Other ingested eubacteria became chloroplasts; these original eubacteria, and the cell that resulted from the endosymbiosis, were able to use sunlight for energy. In this way, selective evolutionary advantages were conveyed to the resulting organisms.

A standard cladogram only shows the branching sequence of independent lines of descent. In the case of endosymbiosis, different lines of descent merge to form a new organism, as suggested by the picture below:



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